U. S. Bureau of Reclamation

Great Plains Region Water Conservation Field Services Program

Part II - FY2005 Program Activity Highlights

Background

'The Mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.'

The Reclamation Program was created by the Reclamation Act of 1902 to reclaim the arid West and to provide economic stability in the 17 western states by developing irrigation projects. Over time, these single purpose projects gave way to the development and construction of multipurpose water resource projects with increasingly greater emphasis placed on the efficient use of developed water supplies, the protection of societal and environmental values, and the protection of the Federal investment and its infrastructure.

In 1996, Reclamation initiated the Water Conservation Field Service Program (WCFSP) to encourage water conservation and efficient use of water supplies on Federal Reclamation projects, as well as foster improved water management on a watershed basis throughout the western states.

The purpose of the WCFSP is to actively encourage water conservation, assist irrigation and other water districts in developing and implementing water conservation plans, and complement and support other state and local conservation efforts. In addition, it helps Reclamation fulfill other obligations under other Federal directives, i.e., Fish and Wildlife Coordination Act of 1958 and the Endangered Species Act of 1973. It provides Reclamation the opportunity to broaden partnerships with other Federal and non-Federal agencies in fostering improved watershed management.

While the program emphasis under the Reclamation Reform Act of 1982 (RRA) is to work with Reclamation projects, the WCFSP is also designed to contribute to watershed management partnerships outside of Reclamation projects in order to improve fish and wildlife habitat associated with water systems or water supplies affected by Reclamation projects.

The Great Plains Region administers Reclamation projects in Montana, North and South Dakota, Colorado, Wyoming, Nebraska, Kansas, Oklahoma and Texas and has a great diversity of irrigation and non-irrigation related constituents. In addition to irrigation districts, Area Office WCFSP Coordinators work with tribal entities, rural water systems, non-profit organizations and municipalities on water management and conservation issues.

Area, Regional, and Denver offices provide technical and financial assistance in the four emphasis areas of the WCFSP:

- Conservation planning
- Conservation education
- Demonstration of innovative conservation technologies
- Implementation of conservation measures.

Following is a summarization of selected activities undertaken by program partners and Reclamation in FY 2005. The activities are organized by the four program emphasis areas.

Conservation Planning

DKAO - Conservation Plan Development
DKAO encouraged water districts to develop, update, and implement water conservation and management plans. Technical assistance and guidance was offered to all interested water users in preparing conservation plans. Seven conservation plans from irrigation entities and six

from municipal and rural water entities have been received and commented on by DKAO. Of the ten irrigation entities in the Dakotas receiving Reclamation water, only three are required to submit plans under RRA.

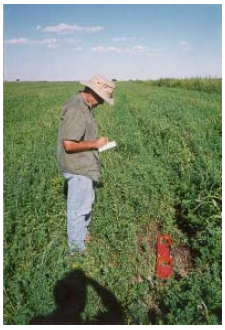
DKAO - Rural Water Systems
DKAO is involved in the planning, design, construction, operations and maintenance of numerous rural water systems in North Dakota and South Dakota. Project sponsors of these systems are required or encouraged to develop a water conservation plan. DKAO staff provided assistance with development, review, and update of plans.


Installing water line on the Mni Wiconi Rural Water System, SD

DKAO worked with the South Dakota Association of Rural Water Systems to provide training, technical assistance, and develop educational programs for the rural water distribution systems.

DKAO – Area Irrigation Specialist, North Dakota State University (NDSU) Extension Service
DKAO participates in a Bridging-The-Headgate cooperative agreement with NDSU, and the Garrison Diversion Conservancy District to cost-share an Extension Irrigation Specialist. The objective of the agreement is to provide local, federal and state coordination and collaboration on planning, educational, and demonstration activities related to irrigation development and water conservation within the Garrison Diversion Project. NDSU has significant irrigation expertise and all parties have a vested interest in efficiently utilizing water resources in the state.

ECAO - Arkansas Valley Salinity Study - Colorado State University (CSU)
This cost-shared project educates irrigators and water managers in the Arkansas Valley about salinity and waterlogging problems and their solutions through field days and workshops. Project findings will be disseminated through appropriate venues, and the interaction and feedback of decision-makers will be sought. Efforts will be made to gain direct input in the development of alternative solutions for consideration in CSU model development.



ECAO - South Platte Basin Salinity Study – Northern Colorado Water Conservancy District (NCWCD)
This project entails a six-year data collection effort of salinity within NCWCD boundaries. NCWCD's Irrigation Management Service group will be collecting water and soil samples. They will also be using the dual EM-38 to determine levels of salinity within fields. Project findings will be disseminated through appropriate venues and the interaction and feedback of decision-makers will be sought.

MTAO – Water Conservation Plans
Through a cooperative agreement, the Montana Department of Natural Resources and Conservation assisted irrigation districts in the Milk River Basin with the development, implementation, and updating of quality water conservation plans.

MTAO – Pumping Plant Evaluation – Toston Irrigation District
The Denver Technical Service Center is currently writing a report evaluating several different alternative changes to the Toston Irrigation District pumping plant. The District is looking into options for modifying the pumping plant to provide them more flexibility in managing the irrigation water with the goal of reducing the amount of tail-water.

NKAO - Conservation Plan Development
NKAO's priority was to work with irrigation districts to update their water conservation plans. NKAO continues to provide assistance in reviewing and updating water conservation plans for 12 Reclamation Irrigation Districts. NKAO also provided planning assistance to private irrigation districts.

NKAO - Water Supply Contract Renewals – Republican River Basin – Solomon River Basin
Water conservation commitments were made by irrigation districts in the Republican and Solomon River basins in order to receive 40-year contracts. NKAO has provided technical and financial assistance to these districts in order to meet system and on-farm efficiency goals set by these commitments. NKAO and these Districts hold annual operations meetings to discuss current year operations, historic operations, completed and planned conservation measures, and future water supplies and system improvements.

OTAO - Municipal Water Conservation Planning
In 2005, the City of Wichita was helped by Area Office and TSC staff to update their water conservation plan. The WCFSP also provided financial assistance to the City of San Angelo to revise the City's water conservation plan.

OTAO - Wholesale Water Provider Conservation Planning
In 2005, Reclamation provided technical assistance to Arbuckle Master Conservancy District and Canadian River Municipal Water Authority to revise their water conservation plans. These revisions will lead to new conservation measures being implemented over the next 5 years.

OTAO – Agricultural Water Conservation Planning
Lugert-Altus Irrigation District was helped by Area Office and Denver TSC staff to update the District's water conservation plan. The District's updated plan was the basis for the District's 2005 Water 2025 proposal. Work to be done through the cooperative agreement funded by the Water 2025 Challenge Grant includes telemetry system expansion (11 sites), flow measurement structure construction (9 sites), long-crested weir check structure construction (9 sites), and rehabilitation of 3 farm turnouts. Technical and financial assistance was provided to Tom Green County WCID No. 1 to update their water conservation plan.

WYAO - State Water Conservationist Position - Wyoming Water Development Commission
This is the ninth year of a cooperative effort between the State of Wyoming and Reclamation to improve water management and conservation within the state. Wyoming has an interest in the success of the WCFSP, and the Wyoming Water Development Commission (WWDC) has significant expertise in the area of water management improvements, evaluations, etc. This effort will reduce duplication of efforts and provide for a larger technical resource pool to draw from. Also, it is anticipated WWDC will be capable of working most efficiently with water users in providing assistance in developing and implementing water conservation plans.

Conservation Education

DKAO – Irrigation District Training and Education Opportunities
Financial assistance was provided to water entities to participate in education and training activities related to water management and water operations. DKAO has agreements with North Dakota State University (NDSU) and South Dakota State University (SDSU) to provide educational information and activities to Reclamation water users. The activities included workshops and field-days as forums to discuss irrigation management, irrigation scheduling, estimating crop water use, and improving irrigation efficiencies.

DKAO – Water Education Festivals and Displays
DKAO participates in Children's Water Festivals in North Dakota and South Dakota as an opportunity to educate elementary grade students in all facets of water.

Teaching about Reclamation and water conservation at Water Festival, Bismarck ND

DKAO participates in annual water conventions in North Dakota and South Dakota in cooperation with the South Dakota Association of Rural Water Systems and North Dakota Rural Water Systems Association.

Belle Fourche SD, Farm and Ranch Expo

DKAO – Crop Water Use and Irrigation Scheduling Information

SDSU operates and maintains weather stations in the Angostura, Belle Fourche, and Rapid Valley project areas with funding provided by DKAO. SDSU uses the weather stations to provide weather and crop water use information for Reclamation projects in South Dakota

ECAO - Rain gauges in Northern Colorado - Colorado Climate Control

This program gives the community in Northern Colorado an opportunity to learn more about their local weather. This is accomplished by providing participants with ECAO sponsored rain gauges. They report to the Colorado Climate Control Center in Fort Collins, any precipitation that occurs throughout the year.

ECAO - Water Festivals – Northern and Southeastern Colorado Water Conservancy Districts and Local Municipalities

A Children's Water Festival is an opportunity to educate 4th and 5th grade students in all facets of water. Reclamation has helped to financially sponsor about 7,000 students along the Front Range of Colorado**.**

Water festival activity at Boulder, CO

ECAO - WCFSP Resource Center

The center has water management information, videos, posters, books, publication, and water conservation tokens and prizes, and all is available to the public.

Display of tokens with Otto Otter

ECAO - River and Riparian Mobile Demonstration Trailer – Southeastern Colorado Water Conservancy District

The river and riparian mobile demonstration center is used in southeastern Colorado to show people

the workings and benefits of a variety of natural resources including rivers, wetlands, and riparian areas. The demonstration trailer is scheduled to be used to educate a variety of target audiences at a variety of community events in southeastern Colorado.

ECAO - Discovery Center Science Museum Water Exhibit - Fort Collins Water Utilities
Through a cooperative agreement, a display of the water cycle was developed and installed in northern Colorado. A control panel with questions and answers is associated with the display to further enhance knowledge of the water cycle.

MTAO - Milk River Watershed News
In cooperation with the Montana Department of Natural Resources and Conservation, MTAO sponsors a newsletter that is mailed to irrigators in the Milk River Project, along with local, state and federal officials, sportsman's groups, and other local citizens. The newsletter is designed to provide timely information to basin residents on issues that have the potential to impact them.

Educators learn about measuring water during a tour of the Lower Milk River coordinated by Montana Watercourse

MTAO – Water Conservation Education
With funding provided through a grant agreement, Montana Watercourse was able to provide information, tours and workshops for educators and citizens in Montana on water conservation, watersheds and water resources. They also reached students through festivals and direct outreach in addition to the students who will benefit from the information their teachers and parents gained through Montana Watercourse.

Eager students volunteer to assist Reclamation's Jeff Peterson during magic tricks which incorporate information on water and Reclamation.

NKAO - Children's Groundwater Festival
NKAO is a major sponsor of the Children's Groundwater Festival which is held annually in Grand Island, NE. 2005 was the 17th year of the festival, which has been used as a model for other states and countries to develop other festivals. Grade school children from over 40 cities attended the festival to learn about groundwater and associated water resources. 2005 was the first year that the festival was organized locally, as the Central Platte Natural Resource District took over the festival lead from the Groundwater Foundation. Reclamation provided funding assistance through the Central Platte Natural Resources District and hosted a presentation at the festival.

NKAO - Project WET (Water Education for Teachers)
Project WET is an interdisciplinary water education program to advise and promote the awareness, appreciation, knowledge, and stewardship of water resources. Recently Project WET has expanded to supply education seminars to upper level college students who will soon be entering the educational field. NKAO provided assistance to the Nebraska 4-H Development Foundation for support of Project WET, along with the University of Nebraska Cooperative Extension, the Nebraska Forest Service, and the Nebraska Game & Parks Commission.

NKAO – Water Measurement Training
NKAO combined with the Reclamation's Water Resources Research Laboratory (WRRL) to provide water measurement training to Kansas. The training was conducted at the Flow Meter Testing and Field Operator Training Facility at the University of Kansas (KU), which was constructed at the existing hydraulics lab through a cooperative agreement with the Kansas Division

of Water Resources. The training was attended by personnel from the Kansas Water Office, the Kansas DWR, the University of Kansas, and Reclamation.

Water measurement course conducted by Bob Einhellig and Tony Wahl of Reclamation's WRRL, along with Kelly Warren of KDWR.

NKAO – Mid-High Plains Education Initiative

NKAO provides assistance to the Groundwater Foundation for the Mid-High Plains Education Initiative. This project's initial target was to continue water resource discussions between all interests involved in the contract renewal process, with the first area of focus being the Republican River Basin. Participating groups include irrigation districts, natural resource districts, groundwater guardian groups, public power agencies, university educators, private irrigators, and other local, state, and federal agencies. The original goal of the project included plans that a local group would take over the leadership of this education project by 2005. A local group called the Republican River Water Conservation and Education Coalition took over the leadership and continues to hold information and educational meetings throughout the Republican River basin.

OTAO - Tour of Irrigation Districts in Wyoming and Nebraska (Bridging-the-Headgate Activity)

During November 2004, OTAO sponsored a tour, with assistance from NRCS staff in Nebraska, of five districts along the Platte River in eastern Wyoming and western Nebraska. Districts toured were Goshen, Gering, Gering-Fort Laramie, Pathfinder, and Farmers Irrigation Districts. The objective of the tour was to share knowledge among District managers of new and innovative water management techniques for operation and maintenance of irrigation facilities. The tour exposed attendees to a wide variety of modern irrigation systems and ideas. Irrigation District managers participated from Oklahoma, Texas and South Dakota.

OTAO - Ditchrider Training Conducted for Lugert-Altus I.D.

On June 15, 2005, staff from Reclamation's Technical Service Center, the GP Regional Office, and OTAO conducted a 1-day Ditchrider Training session for Lugert-Altus Irrigation District Staff and NRCS personnel.

Bob Einheligh of Reclamation's Denver TSC providing instruction to irrigation District Staff and NRCS personnel at the Ditchrider Training Course

OTAO – Flow Measurement Improvements - Lugert-Altus Irrigation District

Reclamation helped design two new measurement structures for the Lugert-Altus Irrigation District in 2005. These structures will help the District better manage the water supply.

OTAO - 2005 Water Management Workshop
OTAO sponsored tuition for Tom Green County WCID to attend Reclamation's 2005 Water Management Workshop. The workshop is hosted annually at Reclamation's Technical Service Center in Denver, Colorado.

Participants at the Water Management Workshop Toured Reclamation's Technical Service Center's Water Resources Research Laboratory as part of the workshop

OTAO –"WaterWise" Water Conservation Education Program- Foss Reservoir Master Conservancy District
Cost shared financial assistance was provided to Foss Reservoir Master Conservancy District to make the "WaterWise" program available in elementary schools within its service area. The WaterWise program was developed for grades 4-8 by the nonprofit National Energy Foundation. The program teaches students and their parents about the water cycle and conservation of water. For a number of years Foss has supported the WaterWise Program.

Students learn about their own home water use, while installing technologies from provided resource action kits to save water, energy, and money on utility bills.

WYAO – Wyoming Project WET – Casper College
Project WET (Water Education for Teachers) is a national non-profit water education program for educators and students, grades K-12. It promotes awareness, appreciation, knowledge and stewardship of water resources. Reclamation provided funds for supplies and materials.

WYAO – Using the Landscape as a Classroom, Introduction to Rangeland Perspectives - Wyoming Agriculture in the Classroom
Reclamation provided funding to Wyoming Agriculture in the classroom. Wyoming Agriculture in the Classroom is working to increase K-12 teachers and students knowledge of the benefit, function, and management of watersheds and riparian zones through a consensus-based decision-making workshop for educators.

Wyoming Agriculture in the Classroom activity

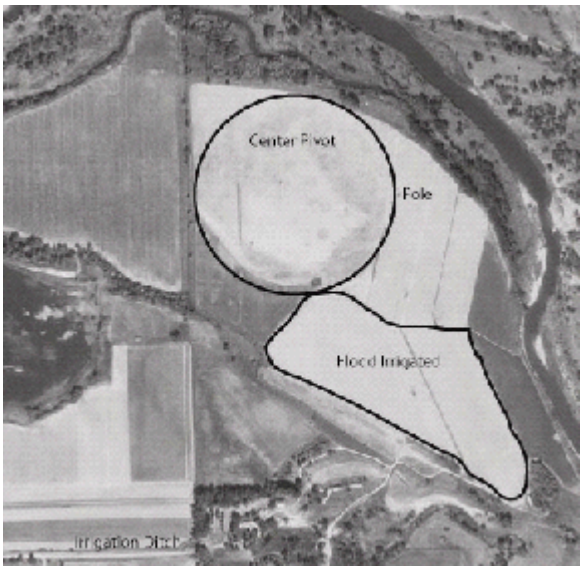
WYAO – Irrigation Conservation Workshops for North Platte Valley Water Users - University of Nebraska - Panhandle Extension and Research Center
Reclamation provided funding to the University of Nebraska to host workshops and operational meetings to highlight new and existing water conservation technologies to assist North Platte Valley water users with making informed water resource management decisions.

WYAO – Water Management Workshop
WYAO sponsored the attendance of various irrigation district personnel at Reclamation's 2005 Water Management Workshop. The Workshop is a seminar for supervisors, managers, water masters, and others responsible for or associated with the operation and maintenance of water systems.

Conservation Technology Demonstration

DKAO – Demonstration Activities
DKAO has agreements with SDSU and NDSU to demonstrate and evaluate innovative conservation technologies to water users. Surge valves, mini-center pivots, and alternative crops with lower water requirements are some of the technologies being demonstrated in South Dakota.

DKAO – Mini-pivot Demonstration
SDSU continued the mini-pivot demonstration project on the Angostura and Belle Fourche Irrigation Districts. The previously flood irrigated fields have soils types that were difficult to flood irrigate; and topography limiting flood irrigation efficiency. The sites showed substantial water and labor savings. Considerable interest in this technology has been generated in the two project areas as evident by over 30 new center pivot irrigation systems being installed since the demonstrations were initiated.



Aerial map of Belle Fourche flood to mini-pivot project site

DKAO - Subsurface Drip Irrigation (SDI) Demonstration
SDSU worked with Reclamation, Belle Fourche Irrigation District and land owners to identify and install two Subsurface Drip Irrigation (SDI) demonstration projects, one under alfalfa and one under vegetables.

DKAO - Shallow Water Intake Screen Demonstration
NDSU continued the demonstration of the shallow water intake screens, one floating and one submerged, which resist plugging; located pump sites in the Buford-Trenton Project using GPS and imported into GIS; continued to develop and demonstrate user-friendly computer based irrigation scheduling tools.


Floating shallow water intake designed, constructed and demonstrated by NDSU for the Heart River Irrigators.

DKAO - Canal Sealant and Seepage Reduction Demonstration Project
A cooperative agreement for conservation demonstration and implementation with Buford-Trenton Irrigation District has allowed the demonstration of a sealant to reduce canal seepage. Irrigation districts cannot afford the expense of lining large canals, or replacing canals with pipelines, without substantial financial assistance. The use of a canal sealant to reduce seepage is a cost effective alternative for districts to consider. The district modified their applicator to more efficiently apply the product after discussing the project with other Reclamation


Buford-Trenton dry PAM applicator

districts. NDSU has been working with the district to develop an applicator suitable for smaller laterals.

DKAO - Xeriscape Landscape Demonstration – Fargo, ND

DKAO has a cooperative agreement with the City of Fargo, ND to conduct a landscape water conservation demonstration. Data is being compiled and analyzed comparing conventional lawn water use to Xeriscape landscapes.

Home of a Fargo Xeriscape study participant

DKAO - Xeriscape Garden

DKAO continued to participate in the Xeriscape demonstration and educational garden developed in cooperation with the city of Fargo, ND. The garden illustrates plantings of very low, low, and moderate water use; alternative turf grasses; a native prairie demonstration; and a riparian plant demonstration. To obtain more information or receive a copy of their free booklet "Discover the Beauty of Xeriscape", visit www.cityoffargo.com/publications.

Fargo Xeriscape Demonstration

DKAO – Canal Lining Demonstration

DKAO is working with Belle Fourche Irrigation District to demonstrate a canal lining material which does not require a soil cover material.

Belle Fourche Project Canal lining demonstration

ECAO - Xeriscape Garden – Southeastern Colorado Water Conservancy District (SECWCD)

The xeriscape garden is the first of its kind in the Pueblo area. This garden educates local users about the type of plants and hardscape to incorporate in their own lawns. The garden is located at the SECWCD headquarters. A variety of local entities contributed time and funds to the garden.

NKAO – Limited Irrigation Management Strategies – UNL Extension Service

Reclamation continues to provide financial assistance to the University of Nebraska for a Limited Irrigation Management Strategies study in the Republican River Basin. The project demonstrates implications of alternative irrigation management strategies on water use and profitability, specifically for deficit irrigation. Interest in this study has been high due to

groundwater pumping restrictions, metering requirements, groundwater well moratoriums implemented in the four Natural Resource Districts in the Republican Basin, and the recently settled lawsuit between Colorado, Nebraska, and Kansas involving the Republican River Basin. New demonstration sites were initiated across southwest Nebraska in 2005. In 2005 a new site was added in the Ainsworth Irrigation District in north central Nebraska which will demonstrate irrigation scheduling and nitrogen management.

NKAO – Surge Valve Loaner Program
Reclamation works with the Natural Resources Conservation Service (NRCS), the local Natural Resource Districts, the University of Nebraska Extension Service, and various Irrigation Districts to educate and assist the irrigators with field setup, operation, and programming of surge valves. District irrigators can use a Reclamation provided surge valve free of charge for one year. At the end of the year, the irrigator can purchase the valve from the District or return it to the District. The District uses these funds to purchase additional valves that will be used the next irrigation season.

NKAO – Water Measurement and Improved Delivery Service Demonstration – Pioneer Irrigation District
Reclamation entered an agreement with the Pioneer Irrigation District to demonstrate various water measurement devices and improved farm delivery service installations. Reclamation's NKAO and Technical Service Center provide technical and financial assistance for various installations. The Nebraska Department of Natural Resources required the District to measure all deliveries prior to the 2005 irrigation season. With Reclamation's assistance, the District was able to meet the Nebraska DNR requirement. Reclamation's assistance has also led to delivery system improvements, on-farm efficiency improvements, and updated District delivery policies. Reclamation was recognized for this assistance by the Colorado State Engineer and the Nebraska Department of Natural Resources Director at the 2005 Republican River Compact meeting.

Pioneer Irrigation District - Elbow meter and trash screen installed as part of demonstration project.

NKAO – Improved Irrigation Efficiency Demonstration Project – KSU
NKAO provided financial assistance to Kansas State University (KSU) for an improved irrigation efficiency demonstration project in the Kansas Bostwick Irrigation District No. 2. The demonstration will compare water use efficiency between subsurface drip, sprinkler, and furrow irrigation systems. A linear move sprinkler was installed prior to the 2002 irrigation season and a sub-surface drip irrigation systems will be in operation for the 2006 irrigation season.

Linear move sprinkler installed on KSU research farm located in the Kansas Bostwick Irrigation District.

NKAO - Subsurface Drip Irrigation - University of Nebraska, West Central Research and Extension Center – North Platte

This project will demonstrate the potential for using subsurface drip irrigation (SDI) to improve water management and conserve the limited water supplies in southwest Nebraska. Information from this demonstration will be presented in technical papers, conferences and seminars, and field demonstration days. Half of the SDI system was installed in the spring of 2004 and the other half was installed in the spring of 2005.

Jose Payero of UNL Extension Service presents information from SDI project at the Research and Extension Center in North Platte, Nebraska at a Crop Water Use Conference held in August of 2005.

WYAO - Subsurface Drip Irrigation - University of Nebraska, Panhandle Research and Extension Center

This project will demonstrate the potential for using subsurface drip irrigation (SDI) to improve water management and conserve surface water supplies in the North Platte River Valley. In 2005, the SDI system was automated and used to irrigate dry beans and corn. The project is investigating the impact on irrigation frequency for corn and dry beans yields using SDI. It will aid the public in developing knowledge on the installation, use, and maintenance of a SDI system in the local area, and provide irrigators an opportunity to observe the SDI in a field setting.

WYAO - Surge-Valve Demonstration Program - University of Nebraska, Panhandle Research and Extension Center

Through a cooperative agreement, Reclamation provided financial assistance to the University for providing demonstrations to water-user entities of surface-irrigation water conservation techniques, including surge irrigation water management. These demonstrations will help water users identify conservation measures to include and implement in their water conservation plans.

OTAO - Custom Staff Gages

Area office staff provided technical assistance to develop customized staff gages for Lugert-Altus Irrigation District. In 2006, the OTAO will help develop and test a new program to create staff gages for flow measurement structures like Parshall Flumes and Cipoletti weirs in collaboration with the Water Resources Research Laboratory at Reclamation's Technical Service Center.

Custom laser engraved staff gages are created for Districts to allow a flow rate to be read directly from flow measurement structures rather than using a traditional staff gages and look-up tables

OTAO – Development of Handheld Software for Ditchrider Water Accounting

At the request of Tom Green County WCID No. 1 and Lugert-Altus Irrigation District, OTAO

Handheld PDAs are planned to be utilized to replace ditchrider paper accounting

developed a prototype handheld software application for recording water deliveries to farm turnouts. It is believed that use of the handhelds will replace paper ledgers for water accounting, thereby improving office efficiency. The project is planned to be completed in FY2006.

OTAO - Flow Meter Demonstration
Reclamation helped the Lugert-Altus Irrigation District evaluate a newly developed flow measurement and solar powered data logging device. The flow meter was demonstrated during the 2005 irrigation season. The aim is to improve water measurement capabilities at problem locations.

Mace solar powered data logger

Implementation of Conservation Measures

DKAO – Implementation of Measures
DKAO has cooperative agreements with 5 districts to cost-share the implementation of approved conservation measures on approximately 85,000 acres of irrigated farmland. The measures are: implementing water measurement and accounting systems; installing and rehabilitating water measurement structures; calibrating water control structures; purchasing flow measurement equipment; testing pumping plant efficiency and pump performance; replacing open laterals with pipelines; purchasing surge valves and gated pipe; converting from flood irrigation to sprinkler systems; converting sprinkler systems to drop nozzles and lower pressure; rebuilding pumps to provide optimum pressure and field uniformity; utilizing a spray-on canal sealant; providing training to district personnel on water measurement, water district operation and maintenance, and canal operation and automation.

DKAO – Canal Replacement Program
DKAO has provided technical and financial assistance to Belle Fourche and Angostura districts to assess and replace high loss, high maintenance sections of open ditch lateral with buried pipe. These projects reduce system water losses, improve water accounting and scheduling, and reduce seepage impacts to adjacent landowners.

DKAO – Canal Structure Automation
Technical and financial assistance was provided to the Angostura and Belle Fourche Irrigation Districts to automate some of the main project distribution structures. Automation will reduce canal fluctuations, relieving problems for irrigators getting to much or too little water and reduce operational wastes.

Belle Fourche Irrigation District, Canal Automation

DKAO - Bridging-the-Headgate Programs
DKAO has a "Bridging-the-Headgate" (B-T-H) cooperative agreement with Belle Fourche Irrigation District and Butte County Conservation District (working through the District Conservationist for the Natural Resources Conservation Service). Agreement is to input project and local utility facilities into a Geographical Information System database; provide technical assistance to the District and

local irrigators, and to collect water quality data within the project.

ECAO - South Platte Watershed Forum – Northern Colorado Water Conservancy District and other entities in the South Platte Basin
An adult based educational opportunity for interested people. The forum focuses on issues in the South Platte Basin.

ECAO - Arkansas River Basin Watershed Forum -Southeastern Colorado Water Conservancy District
An adult based educational opportunity for interested people. The forum focuses on issues in the Arkansas Basin.

ECAO - Update and Integrate Irrigation Scheduling Program into Web Page - Northern Colorado Water Conservancy District
This project will increase irrigation efficiency, improve water quality through reduced run-off and deep percolation and assist farmers implementing Best Management Practices. By developing a precise soil moisture reference standard for tensiometers; updating in field monitoring and reading of tensiometers; and writing software for farmer's accessibility to web-page to run irrigation scheduling program. The project will be completed in 2005.

ECAO - Best Management Practices (BMPs) within the Purgatorie River Water Conservancy District's Boundaries - Natural Resource Conservation Service (NRCS)/Spanish Peaks and Purgatorie Soil Conservation District (PRWCD)
Through a cooperative agreement, water conservation and management BMPs are being developed and implemented on individual farms throughout the PRWCD. Types of BMPs are land leveling, gated pipe, and surge valves. The program is administered through the local NRCS. While in 1996 three farmers participated, the program has now reached 55 of the 172 farmers within the district. The farmer provides 40% of cost for improvements.

ECAO - Cooperative Program of Water Resources Data Collection - Southeastern Colorado Water Conservancy District (SECWCD)
This program is in cooperation with the USGS. The USGS monitors three water measurement sites along the Arkansas River. This information helps to manage the movement of water throughout the Fryingpan-Arkansas Project. This program is in its third year. Reclamation provides financial assistance to SECWCD on a yearly basis depending on the request.

MTAO – Water Measurement – Milk River and Beaverhead River Basins
MTAO has been working cooperatively with the Milk River Joint Board of Control to install sonar water measurement equipment on the main irrigation canals. MTAO has provided funding to purchase the equipment while the irrigation districts have provided the labor and hardware required to mount the equipment in the irrigation canals.

HydroMet Station on the Dodson South Canal as part of the Milk River Joint Board of Control Water Measurement Program

Additional water measurement structures and equipment were installed in the Beaverhead Basin by the Clark Canyon Water Supply Company. Financial assistance was provided through a cooperative agreement.

Ramp Flume on one of Clark Canyon Water Supply Company's Canals

MTAO – Water Management Improvements – Paradise Valley Irrigation District
Paradise Valley Irrigation District has continuously made improvements to their irrigation system ever since their first water conservation plan was completed in 1999. Activities implemented in the past fiscal year include; automation of their headgates, replacement of turnouts with standardized turnouts, and improvements to the water measurement station at the head of the District's main canal.

MTAO – GIS Maps and Equipment – Huntley Project Irrigation District
The District purchased mapping software to improve management of district acres. The district also purchased surveying equipment to improve the efficiency of their clay canal lining process in order to line more canal reaches.

NKAO – Buried Pipe Program
The NKAO has provided technical and financial assistance to various districts for the replacement of high loss and high maintenance sections of open ditch lateral with buried pipe. These projects reduce system water losses, improve water accounting and scheduling, and provide on-farm efficiency improvements. Irrigation Districts participating in this program in 2005 include Frenchman-Cambridge, Nebraska Bostwick, Almena, Kansas Bostwick, Kirwin, and Webster.

NKAO – Nebraska Soil Moisture Monitoring Program – High Plains Regional Climate Center
The NKAO has provided financial assistance to the High Plains Regional Climate Center (HPRCC) for soil moisture monitoring equipment that will be added to the HPRCC's Automated Weather Data Network throughout Nebraska. This equipment will provide real time data that will assist in accessing soil water conditions, crop growth, irrigation scheduling, and monitoring drought conditions. Additional sites were added in 2005 using drought assistance funding.

NKAO – Water Measurement Improvements
The NKAO has provided assistance to various districts to improve the accuracy of water measurement. This includes the construction of ramp flumes at the head of canals, providing equipment for remote monitoring, portable pipe flumes for new lateral measurement sites, and purchased ultrasonic meters that Districts can use to check existing propeller meters.

Broad crested weir being constructed on Courtland Canal below Lovewell Reservoir in north central Kansas.

NKAO – Canal Automation – Mirage Flats Irrigation District
Technical and financial assistance was provided to the Mirage Flats Irrigation District for canal automation. The District has currently has three automated canal sites, and numerous remote monitoring sites. Advances in automation equipment, along with increases in the number of manufacturers of this equipment, have lowered the costs of implementing these projects.

NKAO – Remote Monitoring Installations – State of Nebraska
NKAO has provided technical, financial, and installation assistance for the installation of remote monitoring equipment on existing and new stream gage sites along the Republican River and it's tributaries to assist the Nebraska Department of Natural Resources in administrating surface water rights in the basin. Upgrades were made to existing sites and new sites were added in 2005. These sites have increased operational opportunities in water management in the Republican Basin.

NKAO – Remote Monitoring Installations – Irrigation Districts
NKAO has provided technical, financial, and installation assistance for remote monitoring equipment on wasteways and other key canal measurement sites to improve water management, accounting, and scheduling in the Almena Irrigation District in northwest Kansas, the Frenchman-Cambridge Irrigation District in southwest Nebraska, and the Bostwick Irrigation District in south-central Nebraska. In 2005, NKAO entered into an agreement with the Twin Loups Irrigation District located in central Nebraska for increasing the remote monitoring capabilities of the District.

Remote monitoring site installed on Bostwick Irrigation District in Nebraska's Franklin Canal west of Red Cloud, Nebraska

OTAO – Installation of Ultra Sonic Flow Meter – Central Oklahoma Master Conservancy District (COMCD)
In 2004, OTAO cost shared with COMCD to replace a flow meter used to measure raw water deliveries to the City of Norman. Denver TSC and Area Office Staff provided technical assistance to determine the most accurate and cost effective alternative for obtaining flow measurement. A steel pipe was installed to allow use of an ultrasonic flow meter to measure water deliveries to the city.

Replacement of Non-Functional Venturi Meter with Ultra Sonic Flow Meter at Central Oklahoma Master Conservancy District

OTAO - Wasteway Flow Measurement Study
Lugert-Altus Irrigation District was provided financial assistance to install 9 flumes to measure and record wasteway flows. Flow data will be used to help evaluate the need for re-regulation capability and improve water use efficiency. Under the cooperative agreement Reclamation agreed to provide technical assistance to install and train District staff to use the data logging equipment.

OTAO –Weather Based Irrigation Scheduling - Tom Green County Water Control and Improvement District (WCID) No. 1
Reclamation provided technical assistance to install and program a weather station at the Tom Green County WCID District No. 1. The station collects local weather data to calculate daily evapotranspiration. The data will also be made available on the District's website to help farmers in scheduling irrigations. A field day for local irrigators, to show how to use ET for improved irrigation scheduling, is planned for 2006. This will be a cooperative effort conducted by Tom Green County WCID#1, Texas A&M Cooperative Extension, the NRCS, the Tom Green County Conservation District, and Reclamation.

Weather station at Tom Green County WCID No. 1

OTAO – Water Level Sensor Installed at Lake Thunderbird

Central Oklahoma Master Conservancy District was provided cost shared financial assistance to install a reservoir water level sensor at the Lake Thunderbird Pumping Plant. The water level sensor will help the District to monitor reservoir water levels.

Water level was added to the District's SCADA system interface

OTAO – SCADA System and Computerized Water Accounting System - Lugert-Altus ID

Under a 2004 cooperative agreement, Reclamation provided cost-shared financial assistance to install remote monitoring and automation at key locations within Lugert-Altus Irrigation District. Work is continuing and additional SCADA sites were installed in 2005 through Water 2025 funding. Once the SCADA work is completed, District staff will have the ability monitor and control canal discharge at all major canal gates from the District office as well as from three mobile units installed in District vehicles.

Mobile interface for monitoring and controlling canal conditions

WYAO – Water Accounting Improvements – Casper-Alcova Irrigation District and Farmers Irrigation District

Reclamation provided financial assistance for the purchase of software to provide more effective accounting of water deliveries. The accounting program will help identify dysfunctional measurement devises and canal reaches that are candidates for seepage control.

WYAO – Spillway Automation Project – Gering-Fort Laramie Irrigation District

Financial assistance was provided for spillway automation in the Fort-Laramie Canal. Automation will allow the district to make second by second changes compared to hour by hour which will increase the efficient use of the canal system and increase conservation of the available water supply while reducing labor costs.

WYAO - Gate Automation - Pathfinder Irrigation District

Financial assistance was provided for the automation of Lateral 27 Main, which discharges water from the district's reservoir supply canal. Improvements will include installation of a ramp-flume to accurately measure discharge into the canal and automation will allow the District to remotely control the discharge of the supply canal, improving the responsiveness of the canal system.

Water Conservation Recognition

OTAO - Awards Received by our Partners as a result of work conducted through the WCFSP
In 2005, Tom Green County Water Control and Improvement District No. 1 was presented the Bob Derrington Water Conservation and Reuse Award by the AWWA. Since 1999, one-hundred percent of the District's water supply has been reuse water provided by the nearby City of San Angelo.

District Manager, Yantis Green (right) of Tom Green County WCID No. 1 was presented the Bob Derrington Water Conservation and Reuse Award by the AWWA in 2005

Tom Green County Water Control and Improvement District No.1 was also presented the Texas Environmental Excellence Award in 2005 by the Texas Commission on Environmental Quality for work in modernizing the District and improving irrigation efficiency.

Tom Green County WCID No. 1 was presented the Texas Environmental Excellence Award by the Texas Commission on Environmental Quality

Vision for the Great Plains Regional Water Conservation Program

V I S I O N

In cooperation with water users, states, federal agencies, local entities and others, we in the Great Plains Region should direct our water management and conservation efforts towards helping water users identify and implement water efficiency improvements that will improve the overall beneficial uses of water and related resources.

Through proactive but judicious use of technical and financial assistance, technology transfer, and education programs, we will work in the interest of the public good by:

- Helping to remedy current problems by providing tools (education, training, outreach) to help resolve, and prevent, similar problems in the future,
- Find ways to provide water for beneficial uses which are presently not being met,
- Reducing negative impacts resulting from inefficient water operations, and
- Improving, enhancing or enlarging current benefits for present beneficiaries.

Through successful implementation of the WCFSP, we in the Great Plains Region will demonstrate to the water user community, the public, states, other partners, and staff, our capability and sincere commitment to managing and protecting the water and related resources to which we are entrusted in an environmentally and economically sound manner.